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SUBTEMPORAL DECOMPRESSIVE OPERATIONS FOR THE INTRACRANIAL COMPLICATIONS ASSOCIATED WITH BURSTING FRACTURES OF THE SKULL.*

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DEFINITE rules of procedure in the treatment of fractures which involve the cranial vault are to be found in the earliest medical writings and with but little modification have been accepted as a part of our modern practice. These precepts are chiefly concerned with the reduction of deformations of the skull which have resulted from fragmentation of one sort or another at the pole of impact.

It is otherwise with fractures involving the cranial base: for beyond an ice-cap, recumbency and free evacuation of the bowels, the surgeon's attitude toward these patients, if he is interested at all, lies in the making of a diagnosis to determine if possible into which fossa the lines of fracture have run; in the observing of symptoms to see if, by chance, there is a " free interval," interpreted as an indication of meningeal hemorrhage; and in the giving of a prognosis which, according to Bergmann's dictum, is good—for life, though not necessarily for subsequent health—if the patient survives the first two days following the injury.

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As a matter of fact, though we speak of a well-recognized class of injuries as fractures of the base—a term which conjures up a definite clinical picture—the fracture itself is of practically no importance whatsoever; there is no dislocation of fragments, owing to the pull of muscles as elsewhere on the skeleton; the cracks, which indeed may often be very difficult to find post mortem, unite promptly if life is spared, and so far as the bony injury is concerned no active measures are needed. Injuries, however, of such a character that they lead to a bursting fracture, with meridional fissures which radiate into the base, almost invariably produce serious symptoms from an accompanying lesion or lesions of the brain.

Is there any more or less routine method of intervention which can promptly be utilized to meet the intracranial symptoms which accompany these basal fractures, in the presence of which surgeons usually adopt a waiting policy?

Without entering into the controversy as to what is concussion and how its manifestations and anatomical lesions differ from those of contusion, it may be said that the symptoms of most of these cases are brought about by an increase of intracranial pressure, whether *immediate* from free extravasation due to the laceration of cortical vessels, *intermediate,* often with a "free interval" of consciousness, when an extravasation outside of the dura slowly augments in size, or *late,* often a matter of a few days, when cerebral œdema occurs. In many cases, indeed, the symptoms of these various conditions shade imperceptibly into one another.

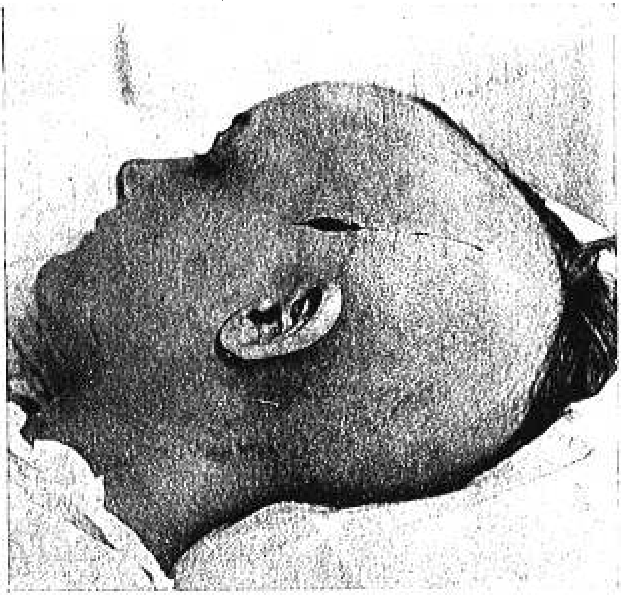
The phenomena of compression are so well understood that they need not be detailed; the slowed pulse, the rise in blood-pressure, the headache, vomiting, and choked disc are seen in their most typical guise in these cases. Particularly have we found that the condition of the eye-grounds is most helpful in recognizing an advancing process, and the presence of free extravasation in the subdural spaces, as is well known, can easily be determined by a lumbar puncture.

During the past three years in a fairly large series of cases we have followed the routine of making a subtemporal exploration through a split-muscle incision combined with a subtemporal decompression—namely, the removal of a circle of the thin bone, about 4½ cm. in diameter, from under the muscle, together with a dural opening. Contrary to our former high mortality in cases of basal fracture—about fifty per cent.—we have only lost two out of our last fifteen cases, both of these due to the fact that a unilateral exploration alone was performed, and an extensive extravasation—extradural in one case, subdural in the other—on the opposite side of the head was overlooked.

The advantages of the procedure, in addition to its simplicity, may be summarized as follows: (1) The approach is made through the thinnest available part of the skull. (2) The opening is made under the temporal muscle, the fibres of which are split and not divided, so that, when closed, they serve to prevent too great bulging, if the tension tends to make the brain herniate, and serve also to prevent a subsequent obtrusive depression when the normal conditions have been restored. A subsequent defect in this situation is absolutely harmless. (3) In case there has been a rupture of the meningeal or of one of its branches the extradural clot is certainly brought into view by this opening, and as the meningeal trunk is exposed the vessel can be easily ligated. (4) In all bursting fractures accompanied by laceration of the brain it is the tips of the temporal and base of the frontal lobes which most frequently suffer, and a subdural extravasation from this source can most readily be dealt with through an opening in this situation. (5) In a large proportion of bursting fractures the lines of fracture seek out the mid-cranial fossa, and hence free bleeding from the base can be most easily drained through the temporal fossa by protective drains placed under the temporal lobes. (6) The subsequent œdema and swelling of the brain, which is an almost invariable sequel of any serious cerebral contusion and which is responsible in many cases for the pressure symptoms during the first two weeks, can be best combated by an opening in this situation under the muscle. (7) Aside from the prompt subsidence of the acute symptoms which are often seen after these operations, they appear to lessen many of the unpleasant late sequels—traumatic neuroses—which are so often a feature of the cases which have recovered without operation.

I believe, in view of our experience with this simple operation—which, in so far as the approach to the cranial chamber is concerned, differs from the subtemporal decompressive operation for tumors only in the obliquely vertical (Fig. 1) instead of curvilinear direction of the scalp incision—that less risk is run even in the milder or border-line cases by a prompt exploration and decompression, than in waiting for nature to take her own course in absorbing extravasations and œdema in an unopened skull.

FIG. I.



Bursting fracture of the skull from fall on left frontal region, with compression symptoms: operation on the third day. Removal of bone under temporal muscle through intermuscular incision disclosed thin extradural clot, subdural extravasation, laceration of temporal lobe and œdematous brain with excess of bloody cerebrospinal fluid under tension. Protective drain from below temporal lobe.

Photograph taken at first dressing forty-eight hours after operation, when sutures and drain were removed. To show line of incision and situation of drain.